DOCUMENT RESUME

ED 230 174 IR 010 692

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TITLE MCE Field Study Project.
PUB DATE Feb 82
NOTE 21p.; Paper presented at the National Convention of the Council for Exceptional Children (Houston, TX, April 12-16, 1982). Best copy available.
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adult Education; *Computer Assisted Instruction; *Computer Programs; *Daily Living Skills; Elementary Secondary Education; *Exceptional Persons; Field Studies; *Microcomputers; Money Management; Program Effectiveness; Questionnaires; Safety; Special Education; Vocational Education

ABSTRACT

The effectiveness of six microcomputer programs designed for the secondary to adult population to teach concepts associated with daily living skills (vocations, elementary budgeting, money management assessment, banking, and home safety) was studied. These programs were field tested in special education classrooms in three different school districts, including (1) 212 classrooms in a metropolitan area in the southeast United States; (2) a secondary learning disabilities room in a midwestern suburban area; and (3) a secondary resource room in a small town/rural area. Students used as subjects ranged from the age of 8 through adults, and included emotionally handicapped, mentally retarded, learning disabled, gifted, autistic, physically handicapped, and profoundly deaf individuals. Findings indicate that using the programs had many positive results in the cognitive and affective domains, and some positive results in the psychomotor domain. These results were noted in all areas (content, educational adequacy, and technical adequacy), with especially promising outcomes with autistic students. Appendices contain results of the teacher evaluation questionnaire and vocabulary test results from the metropolitan study area. (LMM)

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ED230174

MCE Field Study Project

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IR010692

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BACKGROUNG

MCE Inc. in Kalamazoo, Michigan is a company of educators designing and producing multi-media programs primarily for the secondary and adult handicapped population. Recently, their first six microcomputer programs in the content area of basic living skills were developed. In order to determine the educational effectiveness of these programs, a field study project was designed and implemented.

Field Study on these microcomputer programs, called MCE, was conducted in three different school districts. One school district is located in a large multicultural metropolitan area in the southeast part of the United States. The twelve classrooms involved covered many areas of special education including gifted and autistic with ages ranging from eight to adult. The second school system, one secondary learning disabilities room, is located in a predominately white middle class suburb of a medium sized town in the midwest. The third system was also located in the midwest but in a very small town and having primarily a rural population. This latter classroom is a secondary resource room involving emotionally impaired and learning impaired students.

All three groups included special education students interacting with the program and teachers who completed an evaluation form. Each teacher was given the option to employ the program as he/she would in the classroom. The questionnaire asked teachers to respond by making on a continuim to indicate their opinions as to the educational and technical effectiveness of the program(s) used.

Results of the teacher evaluation questionnaires for all three groups may be found in Appendix A. One question was discarded when it was discovered the meaning was unclear.

Suburban Group

Three MCE programs were used in the classroom during a three day period in December 1981 with a mathematics class for learning disabled secondary students. The students, with reading levels from 2.0 through 5.0, used the programs independently without using any of the supplementary material or teaching suggestions from the Instructional Guide. The instructor did indicate, however, that sufficient written materials explaining the program as well as sufficient supplementary materials were available. The program, Income Meets Expenses, was rated highest of the three used in this setting, with You Can Bank on It second, and Money Management Assessment third. On You Can Bank on It it was indicated that higher levels would be a suggestion for an additional option. On Money Management Assessment it was indicated that spelling was difficult. Since no spelling is required it is assumed the instructor was referring to the vocabulary assessment indicating his students need vocabulary reading instruction prior to completing money management programs.

Small Town/Rural Group

The small town/rural group used the field study form to report on the MCE program, Money Management Assessment. The results were primarily positive although the teacher was concerned about cost-effectiveness because of severe budget cutbacks in the system. The reading grade equivalent range

of this group was 1.5 to 10.8 and the students were all 16 or over. A secondary language arts and a reading development program used the program. Many of the teaching suggestions and supplementary materials were used as well as many teacher created materials. The instructor indicated that she administered tests to the group but did not report scores. Since the reported gains were in "vocabulary knowledge and concepts pertaining to money management," the vocabulary sheet in the supplementary materials of the Instructioanl Guide were probably employed. "Other factors which seemed to increase were: 1) student motivation, 2) student independence (work habits and self-pacing abilities) and 3) self concepts." The instructor's suggestions indicated that access is needed into the program in order to start at points other than the beginning. One feature the instructor especially found beneficial was the error analysis feature on the mathematics skill assessment. She feels that more programs in the mathematics and language areas should have this feature.

In the early fall of 1981, this rural/small town special education classroom was asked to do a field study on the MCE program, Poison Proof Your Home. The instructor at that time verbally indicated her excitement about what she termed one of the best programs she had ever seen and one of the few that is educationally effective. Four students viewed portions of this program at a time. The instructor had previously written a set of questions to answer while viewing the program. While viewing the program, one student was in charge and ran the program while the others took notes. At the conclusion of the part of the program viewed, the students

answered the questions and discussed other questions that could have been addressed. In order to reinforce the concepts presented in the program, the following activities were carried out:

1. Student-made worksheets created from their notes.
2. List of poisons in the individual homes.
3. Pictures (student drawings) of accident/poison related-incidents -- which resulted in a poster contest.
4. School nurse as a guest speaker.
5. Poison indentification game -- the teacher brought in items from home and students had to tell why each product was dangerous and how dangerous incidents could be avoided.

Large City Multicultural Group

The most inclusive study was completed by twelve classrooms covering many handicapping conditions housed within a large metropolitan multicultural district in the southeast corner of the United States. All twelve instructors (13 student groups) gave solid three ratings to the material as well as doing pre- and post-testing of their group using the vocabulary tests found in the Instructional Guide of the program. The results of the pre- and post-tests may be found in Appendix B.

Metropolitan Area Analysis by Group

group A -- EMOTIONALLY HANDICAPPED

This group viewed the MCE program, Job Readiness, independently or in small groups. Considerable growth was noted between pre- and post-testing on the vocabulary tests. It was suggested that a lower branch of presentation would be useful.

group B -- TRAINABLE MENTALLY RETARDED

This group viewed the MCE program, Job Readiness, in small groups and as a class. Considerable growth was noted between pre- and post-testing on the vocabulary tests. The program was operated independently by the students after instruction and directed supervision. It was suggested that a lower branch with more graphics and worksheets with survial symbols would be useful. The instructor said that he did not believe his student "could do so much... They were motivated and tried hard and learned a lot."

group C -- LEARNING DISABLED

This group viewed the MCE program, Income Meets Expenses, independently. Considerable growth was noted between pre- and post-testing. It was suggested that more branches, both higher and lower, would be useful; as well as the addition of dittos. These students were extremely motivated and were challenged to provide correct responses so that they were not branched to lower levels. The program also had to be used as a reward because they would otherwise not "get away from the computer long enough to do their work or otherwise let other students use it." She went on to say that "this is the most challenging and motivational teaching tool I've used with these kids in fourteen years."

group D -- LEARNING DISABLED

This group viewed the MCE program, Money Management Assessment, independently. Again, considerable growth was noted between pre- and post-tests. A lower branch and more worksheets were suggested for additional programs. Another

comment noted that a consultant "hounded me to do this -- and now I'm hooked!"

group E -- GIFTED, ELEMENTARY

This group viewed the MCE program, Home Safe Home, independently. Growth was noted between pre- and post-testing. It was suggested that the concepts could be expanded for the gifted population by adding higher level branches. These students, unlike the learning disabled who tried hard not to make mistakes in order to stay at higher levels, made "mistakes just to see what the program would do."

group F and G -- TRAINABLE MENTALLY RETARDED
EDUCABLE MENTALLY RETARDED

This group viewed the MCE program, Poison Proof Your Home, first as a group, then in small groups, then individually, and finally in small groups again so that they could reinforce each other. Both groups showed considerable growth between the pre- and post-testing. Some of the students had difficulty with the directions so they were put on the blackboard and reviewed. Charts were used in connection with the program. The vocabulary was used in exercises involving spelling and sentence writing. A field trip was taken to a hospital emergency room where a doctor gave the students a lecture on the subject and actual samples of poisons were shown and discussed. The students also had to be shown the return key and had to learn not to yell "help" when "help" appeared on the screen. One student typed in a vulgar remark when asked to type his name. The computer then referred to him as that vulgarity throughout the program. He then told everybody

how the machine had referred to him. Therefore, it was suggested that computer programs consider the possibility of not acknowledging certain terminology.

group H -- AUTISTIC

This group viewed the program, Income Meets Expenses, independently and tended to view the program "over and over again." Considerable growth was noted between the pre- and post-test. This medium was considered by the teacher to be especially appropriate because the students are "tuned" into machines. According to the teacher --

> "they became very excited -- had to threaten to take away their disk unless they behaved. One boy 'sang' all the directions -- disturbed everyone, but I was thrilled. It's the first time he took an interest! I didn't even know he could add. His mother was so happy, she went into debt to buy him an Apple."

It is understood that the teacher taped the entire printed information in monotone, then talked the same text in a monotone and gradually replaced the machine with herself. In other words, she entered their world as a machine and gradually "humanized" her voice so that the students could reach the "outside" world. The teacher also indicated that music helped the students to concentrate.

group I -- PHYSICALLY HANDICAPPED

This group viewed the MCE program, You Can Bank on It, in small groups. Considerable growth was noted in this group based on the test results. It was suggested that more work-sheets and that branching to a higher level would be useful.

Some difficulty was noted for students using mouth probes when they accidently hit keys twice resulting in errors. However, with practice they got better.

group J -- SOCIALLY MALADJUSTED AND ADJUDICATED

This group viewed the MCE program, Poison Proof Your Home, independently. The program ran to completion with no problems. However, when students "wrote bad words" instead of yes or no, the machine would keep repeating the directions. Considerable growth in vocabulary was noted based on test results. The only comment indicated that a branch to a lower level would be beneficial for lower level functioning students.

group K -- EDUCABLE MENTALLY RETARDED
EMOTIONALLY HANDICAPPED
LEARNING DISABLED

This group viewed the MCE program, You Can Bank on It, as a class, as a small group, and independently. Again, considerable growth was noted in the group based on this program. Lower and higher levels could be added was the only suggestion made by the teacher.

group L -- PROFOUNDLY DEAF

The MCE program, Home Safe Home, was viewed in small groups by these students. The scores on the post-test were considerably higher than on the pre-test. The teacher suggested more graphics. She also had to sign directions for the students at first.

group M -- EDUCABLE MENTALLY IMPAIRED
LEARNING DISABLED
EMOTIONALLY HANDICAPPED

This group viewed the MCE program, Money Management Assessment, independently. The results of testing indicated considerable growth. The teacher suggested both higher and lower branches would be useful.

CONCLUSIONS

The results of this field study indicate many positive effects using these microcomputer programs in the cognitive and affective domains -- and somewhat in the psycho-motor domain. The programs also received positive ratings in all areas of content, use of educational prinicples, and technology. Branching was considered effective, although it was frequently suggested that more branches be added to higher as well as lower functioning levels. Therefore, microcomputer programs that are based on sound educational principles can be educationally effective for handicapped students in many areas of exceptionality -- especially if they are used in connection with other materials and experiencial situations.

ONGOING MCE PRODUCT DEVELOPMENT

Many of the suggestions provided by the teachers involved in the field study have been considered and implemented in the development of the newest MCE programs. The lowest conceptual level is lower wherever possible and an additional level has been added for more advanced students that involves interaction and simulation. Graphics have been and continue to be employed to increase educational effectiveness.

In order to control inappropriate input when the student's name is requested at the beginning of each segment, a test will indicate that the inappropriate name is unacceptable.

Improvements have also been made in the Instructional Guides providing additional supplementary materials and the listing of concepts per part of the program. It is also important to note that each program may now be entered at the beginning of any concept and at any functioning level. This and other options are available to the instructor at the beginning of each program part.

APPENDIX A

Teacher Questionnaire Results

APPENDIX B

Vocabulary Test Results

from

Metropolitan Study Area

APPENDIX A

TEACHER QUESTIONNAIRE RESULTS

(3=High 2=Medium 1=Low)

Question Synopsis	Large City X (n=12 teachers, 12 classes, 6 programs)	Suburb X (n=1 teacher, 1 calss, 3 programs)	Rural X (n=1 teacher, 2 classes, 1 program)
1. Prog. Consistent w. obj.	3.00	3.00	3.00
2. Sequenced	3.00	3.00	3.00
3. Vocabulary	3.00	2.67	3.00
4. Effective Branching	3.00	3.00	2.00
5. Inappropriate R, Handled Appropriately	3.00	3.00	3.00
6. Work Independently	3.00	2.67	3.00
8. R to Student R Effective	3.00	3.00	3.00
9. Redundency/Drill	3.00	2.67	3.00
10. Progress Indication	3.00	2.67	3.00
11. Amount at a Time	3.00	2.00	3.00
12. Section Length	3.00	2.67	3.00
13. Personalized	3.00	3.00	3.00
14. Music, blinks, prompts	3.00	2.33	3.00
15. Graphics, Color, Animation	3.00	3.00	3.00
16. Easy to use	3.00	3.00	3.00
17. Learning Theory	3.00	3.00	3.00
18. Good Use of Medium	3.00	*3.00	3.00
19. Cost-effective	3.00	**1.50	2.00
20. Motivating	3.00	2.00	3.00
21. Improvement Noted	3.00	2.00	2.50
OVERALL VALUE	3.00	2.50	3.00

*Two Responses were "I don't know"

**Indicated other methods were more cost-effective

APPENDIX B

VOCABULARY TEST RESULTS FROM METROPOLITAN STUDY AREA

NOTE: Groups A-J reported the lowest score and the highest score (N) allowing the figuring of the pre- and post-test range of low and high score for each vocabulary test alphabetically coded. The percent given is the percent correct of the total possible for the pre- and post-test scores. The Minimum Growth is the number and percent difference between the lowest pre-test score and the lowest post-test score.

GROUP A

MCE PROGRAM NAME: Job Readiness
STUDENT CATAGORY: Emotionally Handicapped
NUMBER OF STUDENTS: 2
STULENT AGE RANGE: 12-13
READING GRADE EQUIVALENT LEVELS: 1.7 - 2.3
STUDENT I.Q. RANGE: Normal

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	2	10%	11	55%	10	50%	16	80%	8	40%
B	0	0%	7	35%	12	60%	14	70%	12	60%
C	1	5%	13	65%	15	75%	18	90%	14	70%
D	2	10%	12	60%	14	70%	19	95%	12	60%
E	0	0%	6	28%	12	57%	17	80%	12	57%

GROUP B

MCE PROGRAM NAME: Job Readiness
STUDENT CATAGORY: Trainable Mentally Retarded
NUMBER OF STUDENT: 24
STUDENT AGE MEAN: 18
READING GRADE EQUIVALENT LEVLES: 0 - 1.7
STUDENT I.Q. RANGE: 28 - 44

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	0	0%	7	35%	4	20%	10	50%	4	20%
B	0	0%	10	50%	5	25%	14	70%	5	25%
C	0	0%	7	35%	4	20%	12	60%	4	20%
D	0	0%	4	20%	1	5%	6	30%	1	5%
F	1	4%	7	33%	3	14%	9	42%	2	9%

GROUP C

MCE PROGRAM NAME: Money Management
STUDENT CATAGORY: Learning Disabled
NUMBER OF STUDENTS: 41
STUDENT AGE MEAN: 14
READING GRADE EQUIVALENT LEVELS: 2.6 - 4.1
STUDENT I.Q. RANGE: Not given

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	12	57%	17	80%	16	76%	21	100%	4	19%
B	7	35%	14	70%	17	85%	20	100%	10	50%
C	0	0%	4	50%	8	100%	8	100%	8	100%

GROUP D

MCE PROGRAM NAME: Money Management
STUDENT CATAGORY: Learning Disabled
NUMBER OF STUDENTS: 41
STUDENT AGE MEAN: 14
READING GRADE EQUIVALENT LEVELS: 2.6 - 4.1
STUDENT I.Q. RANGE: Not given

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	6	28%	17	80%	16	76%	20	95%	10	47%
B	4	19%	15	71%	17	80%	21	100%	13	61%

GROUP E

MCE PROGRAM NAME: Home Safe Home
STUDENT CATAGORY: Gifted Elementary
NUMBER OF STUDENTS: 58
STUDENT AGE MEAN: 8
READING GRADE EQUIVALENT LEVELS: 6.7 - 9.1
STUDENT I.Q. RANGE: 140 PLUS

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	12	80%	12	80%	15	100%	15	100%	3	20%
B	14	70%	14	70%	20	100%	20	100%	6	30%

GROUP F

MCE PROGRAM NAME: Poison Proof Your Home
STUDENT CATAGORY: Trainable Mentally Retarded
NUMBER OF STUDENTS: 8
STUDENT AGE RANGE: 12 - 15
READING GRADE EQUIVALENT LEVELS: 0.4 - 1.2
STUDENT I.Q. RANGE: 32 - 47

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	0	0%	4	20%	4	20%	12	60%	4	20%
B	0	0%	7	35%	6	30%	14	70%	6	30%

GROUP G

MCE PROGRAM NAME: Poison Proof Your Home
STUDENT CATAGORY: Educably Mentally Retarded
NUMBER OF STUDENTS: 18
STUDENT AGE RANGE: 12 - 15
READING GRADE EQUIVALENT LEVELS: 1.7 - 3.6
STUDENT I.Q. RANGE: 67 - 71

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	2	10%	11	55%	7	35%	17	85%	5	25%
B	8	40%	14	70%	12	60%	20	100%	4	20%

GROUP H

MCE PROGRAM NAME: Income Meets Expenses
STUDENT CATAGORY: Autistic
NUMBER OF STUDENT: 8
STUDENT AGE MEAN: 13
READING GRADE EQUIVALENT LEVELS: 4.6 - 8.9
STUDENT I.Q. RANGE: Normal

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	9	42%	16	76%	14	66%	21	100%	5	23%
B	7	35%	12	60%	18	90%	20	100%	11	55%
C	3	37%	7	87%	5	62%	7	87%	2	25%

GROUP I

MCE PROGRAM NAME: You Can Bank On It
STUDENT CATAGORY: Physically Handicapped
NUMBER OF STUDENT: 26
STUDENT AGE MEAN: 14
READING GRADE EQUIVALENT LEVELS: 4.3 - 7.2
STUDENT I.Q. RANGE: 84 - 126

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	2	13%	15	100%	11	73%	15	100%	9	60%
B	4	26%	15	100%	11	73%	15	100%	7	46%

GROUP J

MCE PROGRAM NAME: Poison Proof Your Home
STUDENT CATAGORY: Socially Maladjusted and Adjudicated
NUMBER OF STUDENTS: unknown
STUDENT AGE MEAN: 18
READING GRADE EQUIVALENT LEVELS: 2.1 - 3.7
STUDENT I.Q. RANGE: not given

TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
	LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
	N	%	N	%	N	%	N	%	N	%
A	2	10%	10	50%	7	35%	14	70%	5	25%
B	0	0%	8	40%	9	45%	16	80%	9	45%

GROUP K

MCE PROGRAM NAME: You Can Bank On It
STUDENT CATAGORIES: 1. Educable Mentally Retarded
2. Emotionally Handicapped
3. Learning Disabled
NUMBER OF STUDENTS: Group 1 = 11
Group 2 = 16
Group 3 - 14
STUDENT AGE MEAN: 14.5
READING GRADE EQUIVALENT RANGE: 2.4 - 5.6

GROUP	TEST	PRE-TEST				POST-TEST				MINIMUM GROWTH	
		LOW SCORE		HIGH SCORE		LOW SCORE		HIGH SCORE			
		N	%	N	%	N	%	N	%	N	%
1	A	2	7%	10	71%	8	57%	14	100%	6	35%
	B	0	0%	8	53%	8	53%	12	80%	8	53%
	C	0	0%	5	50%	7	70%	9	90%	7	70%
2	A	0	0%	14	100%	13	93%	14	100%	6	43%
	B	6	45%	15	100%	14	93%	15	100%	8	53%
3	A	9	64%	12	86%	12	86%	14	100%	3	21%
	B	8	53%	11	73%	13	87%	15	100%	5	33%
2&3	C	10	100%	10	100%						

NOTE: Group K reported the lowest score and the highest score (N) allowing the figuring of the pre and post-test range of low and high score for each vocabulary test alphabetically numbered for each group numerically numbered. The percent given is the total correct for the pre and post-test scores. The Minimum Growth is the number and percent difference between the lowest pre-test score and the lowest post-test score.

GROUP L

MCE PROGRAM NAME: Home Safe Home
STUDENT CATAGORY: Profoundly Deaf
NUMBER OF STUDENTS: 23
STUDENT AGE MEAN: 10
READING GRADE EQUIVALENT RANGE: 3.7 - 6.1

TEST	PRE-TEST X		POST-TEST X		AVERAGE GROWTH	
	X	%	X	%	N	%
A	12	60%	18	90%	6	30%
B	11	55%	19	95%	8	40%

GROUP M

MCE PROGRAM NAME: Money Management Assessment
STUDENT CATAGORY: 1. Educable Mentally Retarded
2. Emotionally Handicapped
3. Learning Disabled
NUMBER OF STUDENTS: Group 1 = 12
Group 2 = 18
Group 3 = 16
STUDENT AGE MEAN: 17
READING GRADE EQUIVALENT RANGE: 3.2 - 5.1

GROUP	TEST	PRE-TEST X		POST-TEST X		AVERAGE GROWTH	
		X	%	X	%	N	%
1	A	6	29%	11	52%	5	24%
	B	4	19%	9	43%	5	24%
2	A	9	43%	19	90%	10	48%
	B	8	38%	18	86%	10	48%
3	A	7	33%	17	81%	10	48%
	B	9	43%	20	95%	11	52%

NOTE: Groups L and M reported mean scores for each test (alphabetically numbered) for each group (numerically numbered). The mean growth is the mean score difference between pre and post-tests and the test score percentage gain.